Arcade Learning Environment

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Arcade Learning Environment(ALE)

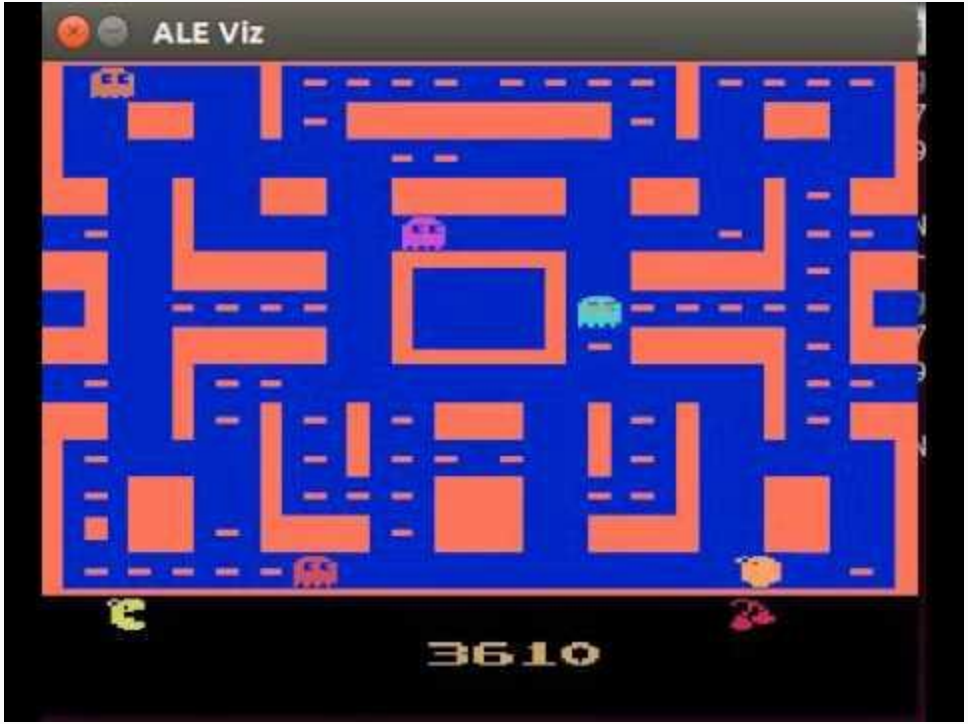
- A software framework designed to make it easy to develop agents that play arbitrary Atari 2600 games
- Atari 2600
  - Single game screen is 160 pixels wide and 210 pixels high
  - Two modes
    - SECAM mode: 8-colour palette
    - NTSC mode: 128-colour palette
  - 18 actions (In maze game only 4 main actions that represent the direction to move and one a no operation action)

Maze games in Atari

- Ms. Pacman, Alien, Amidar, Bank Heist etc.
- Most of these maze games have scored less than human expert in DQN
  - Complexity might be recognizing the restricted motion due to the maze
- Challenges faced:
  - Detecting maze pattern from the game
  - Finding the useful set of actions in each frame

Ms Pacman

- DQN performance - 2311 ± (525) over 30 episodes
  - True mean - 2311 ± (95.85)
- Our algorithm - 5391.81 ± (2043.91) over 100 episodes
  - True mean - 5391.81 ± (204.39)


ALE Viz
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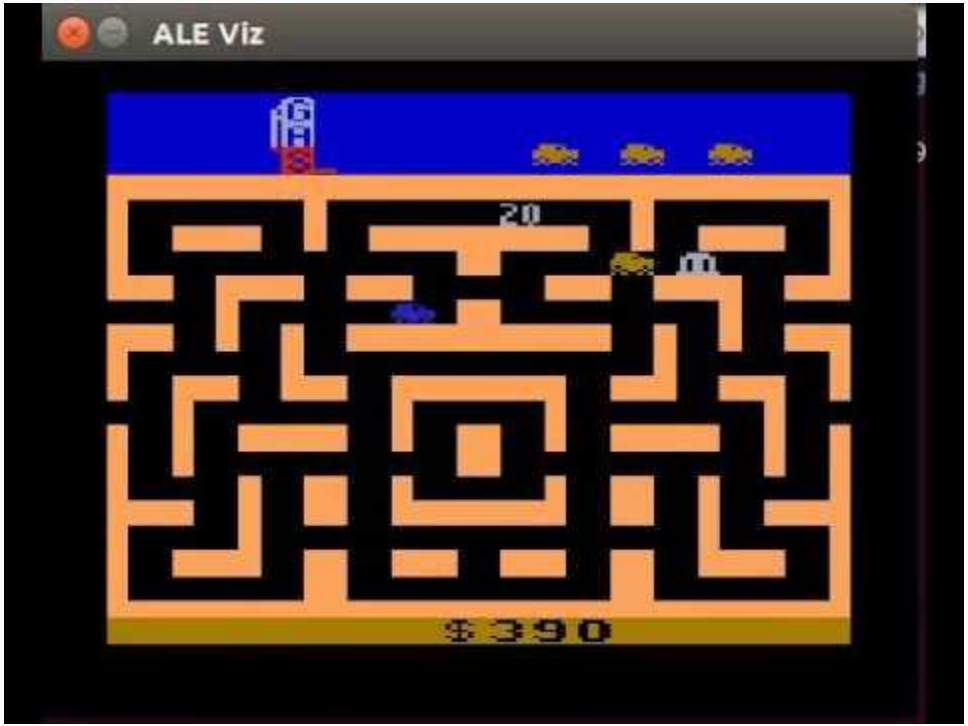
Bank Heist

- DQN performance - 429.7 ± (650) over 30 episodes
  - True mean - 429.7 ± (118.67)
- Our algorithm - 636.9 ± (83.4) over 100 episodes
  - True mean - 636.9 ± (0.83)


ALE Viz
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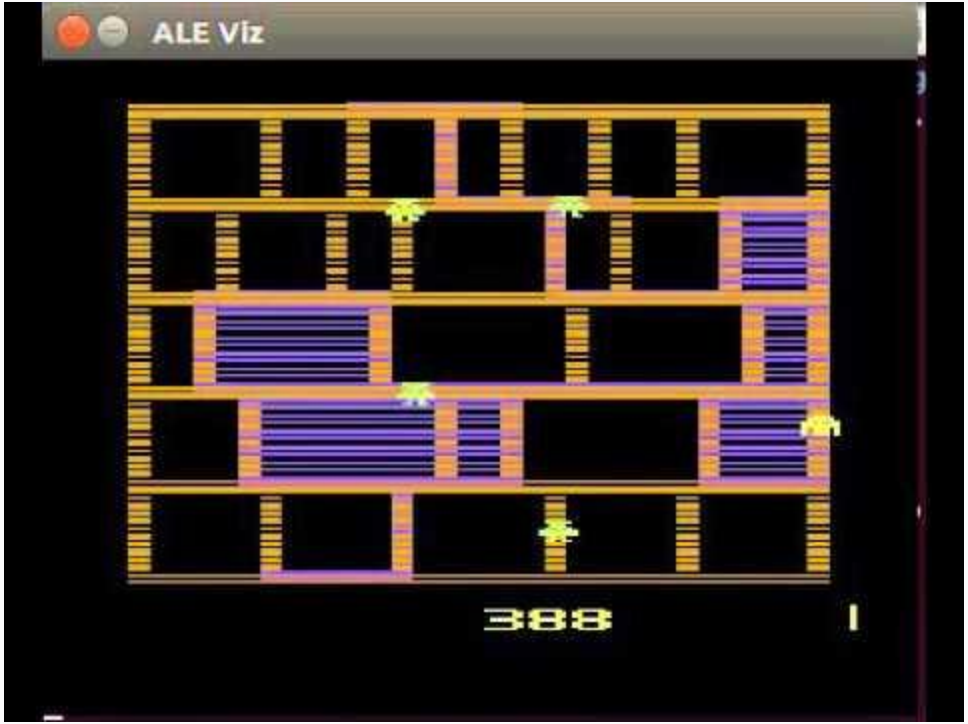
Amidar

- DQN performance - 739.5 ± (3024) over 30 episodes
  - True mean - 739.5 ± (552.10)
- Our algorithm - 1050.61 ± (310.70) over 103 episodes
  - True mean - 1050.61 ± (30.61)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